than were contained in the appendices to the original report.

It was found that all the bindings examined showed evidence of decay, but the books bound during the last 80 or 100 years were in a worse condition than many of those of an earlier date; some recent binding had deteriorated in as short a period as five years. The deterioration became more general in books bound after 1830; some leather seemed to be good until 1860, after which date nearly all leather appeared to get worse.

Besides the quality of the leather, the conditions under which books are kept have a great influence on the durability of the bindings. When ventilation is good and artificial light is not used the books are in a better condition. The products of the combustion of gas do much mischief, especially on the upper shelves of a library, where the temperature is often considerably raised by the heat from the flames. Sad to relate, tobacco smoke is said to be deleterious. Daylight, and especially direct sunlight, has a bad effect on some leathers and also on the colours of the dyes.

The report discusses fully the durability of the different kinds of leathers which have been used for bookbinding and also the construction of bindings; a specification for binding heavy or valuable books and also one for ordinary library binding are given.

The second subcommittee investigated the cause of decay by many experiments. Three different kinds of skins were tanned with eleven different agents, the tanning process being modified in portions of the specimens. Small strips of the leathers were fastened on boards with one half of each strip exposed and then submitted to various actions—direct sunlight, light from a fish-tail gas-burner, light from an incandescent gas-burner and from an incandescent electric lamp, the fumes and heat of burning gas, currents of moist and dry air alternately in a closed vessel kept at a temperature of 60° to 70° F., carbonic acid gas, and sunlight, but protected from air by glass; the results of many of these experiments are shown by excellent coloured plates.

Experiments were made with purchased leathers, most of which were found to contain free sulphuric acid; this acid has been used of recent years for brightening the colour of bark-tanned calf, from which it removes the iron and tan stains, and much improves the appearance of the material. It was found that in every case the presence of sulphuric acid hastened the destruction of the leather by all the agents tried. The sulphuric acid cannot be entirely removed from the leather by washing with water; a piece of leather containing 1 per cent. of sulphuric acid was washed for five days and nights in running water, and was afterwards found to contain one-fifth of the original quantity of acid. It was found, however, that if leather containing sulphuric acid is washed with potassium or sodium lactate or acetate the effects of the sulphuric acid are neutralised.

Sulphuric acid is also introduced into leather by the pickling which is used for preserving skins that are imported from New Zealand and Australia, the process consisting of acting on the skins with a solution of salt and sulphuric acid. Mr. Seymour-Jones has shown that formic acid may be used in the place of sulphuric acid, and is quite as efficacious. Sulphuric acid is employed in the dye bath for the purpose of liberating certain colours; it has been found that in this case also formic acid may be substituted.

Mr. Seymour-Jones has made a number of determinations of the mechanical strength of skins in their original condition, and also after tanning and other processes; it was found that the breaking stress of the leather is always below that of the original skin.

Valuable sections on the preparation of leather suitable for bookbinding, on bookbinding, and on the preservation of books appear in the report. Appendix i. consists of hints to owners and keepers of libraries by the chairman, Lord Cobham. Appendix ii. is on the fading of colour from sumach-tanned leather dyed with coal-tar colours, by Mr. M. C. Lamb, and is illustrated by coloured plates.

The book is excellently printed and illustrated, and inside the cover are specimens of six varieties of leather in their undyed and dyed conditions. The report should be read by all interested in books and libraries.

H. M.

OUR BOOK SHELF.

A Treatise on Ore and Stone Mining. By Sir C. Le Neve Foster. Sixth edition, revised and enlarged by Bennett H. Brough. Pp. xxx+799. (London: Charles Griffin and Co., Ltd., 1905.) Price 34*s*.

THIS book, when it first appeared in 1894, was the first systematic treatise on mining published in England, and was quite up to date; but later editions were not sufficiently revised, and the hand of death put an end to the gifted author's intentions of re-writing the work. The preparation of a new edition could not have been entrusted to more competent hands than those of his old colleague Mr. Bennett H. Brough. The general arrangement of the book is the same as in former editions, except that chapter xiv., "Principles of Employment of Mining Labour," has become chapter xvii.

The revision of the whole work has been very thorough; recent discoveries of important occurrences of minerals and new methods of mining and treating ores have been brought up to date, while other methods, machinery and appliances, which have been superseded during the last few years, are omitted from this edition.

Additions to the work are interspersed throughout, so that it is difficult to make selections. More prominence is given to the important iron-ore deposits of Sweden and Norway, also to those of Spain. The various kinds of steam turbines, which may, under certain conditions, be used to advantage as motors for pumps, are briefly described. A considerable addition has been made to the list of important percussive rock drills now on the market. The Water Leyner rock drill with its water-flushing apparatus, which tends to prevent miners' phthisis, is introduced to the reader, and the recent important investigations of Dr. Haldane and Mr. Thomas into the mortality of Cornish miners receive the attention they deserve.

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We find no mention in chapter vii.—"Haulage"—of Koppel's hydroleum steam locomotive, which is in use at some mines in Great Britain and elsewhere for underground haulage, and deserves to be better known. A 10-horse-power locomotive costs 285*l.*, and burns on an average 1½ gallons an hour of crude petroleum, which can be bought for 3*d.* a gallon. Acetylene hand lamps (p. 544) are also used at some of the mines in Great Britain, while one mine at least has had its pass-byes illuminated for years by 30-candle-power acetylene burners supplied from a small generating plant.

We would warn the mining student not to make a pilgrimage to the Frongoch Mine, mentioned more than once, as, unfortunately, the whole of the fine electrical and dressing plant has passed under the auctioneer's hammer and been dismantled.

The amount of accurate and up-to-date information contained in this volume is enormous. No mining student at home can afford to neglect it, and it is a library in itself to mining engineers who go abroad.

The Useful Plants of the Island of Guam. By W. E. Safford. Pp. 416. (Washington: Government Printing Office, 1905.)

DURING the last few years there has been a remarkable advance in the application of scientific knowledge to the cultivation of economic products, and as a result there has arisen a demand for authoritative books providing accurate and recent information. The Department of Agriculture in the United States of America has taken the lead with its useful series of bulletins of an eminently practical nature. In addition there is need of handbooks, similar to this volume by Mr. Safford, which give a comprehensive account of the products of a country or colony. Dr. Watt's dictionary of the economic products of India is a monumental compilation dealing with an area that embraces tropical, subtropical, and mountainous regions, and describes not only indigenous products, but another fifty per cent. of introduced plants; in its present form, size and cost preclude its general use, although it is a valuable work of reference.

The island of Guam, about 100 miles in circumference, is the largest of the Ladrone or Marianne Islands, and passed into the possession of the Americans after the late war, while the rest of the islands were sold by Spain to Germany. The author had many opportunities of studying the islanders and different parts of the island, and made excellent use of this advantage, so that his information is the result of personal observation and inquiry. The introduction, forming nearly half the book, contains a general account of the history, physical conditions, vegetation, fauna, and ethnology, while in the second part is given an alphabetical list of plants with vernacular names and descriptions. Mr. Safford formed a very favourable opinion of the islanders. Agriculture is universally pursued, and even the artificers leave their trade from time to time to attend to the *rancho*. Maize is the principal food crop, rice is grown, but not in sufficient quantity to supply the demand, and taro and yams are cultivated as well as tobacco. Coffee is grown round most of the habitations, requiring little attention, and plantains and bread-fruit thrive luxuriously. Although copra provides the only article of export, the number of economic plants that are indigenous or have been introduced is exceedingly large, so that the list of plants and the information provided would be useful in many tropical countries. Of fibre-yielding plants twenty-three are recorded, including pine-apple, ramie, kapok, cocoa-nut, plantain, Manila hemp, Sida and a Pandanus, but the most valued plant is *Hibiscus tiliaceus*, from which the natives make all their cordage and cables. The island will produce plenty of citrus and other fruits, and several farinaceous and oil-yielding plants were observed. The book is lavishly supplied with excellent illustrations and the information is readily obtainable; in fact, the volume supplies a good model for future compilations of a similar nature, the main defect being a somewhat unusual nomenclature, which does not, however, cause any difficulty in the determination of the plants referred to.

The British Journal Photographic Almanac and Photographer's Daily Companion for 1906. Edited by George E. Brown. (London: Henry Greenwood and Co., 1905.) Price 1*s.* net; 1*s.* 6*d.* cloth.

THE present issue of this year-book appears under the direction of a new editor, Mr. G. E. Brown, but the contents in no way suffer from this change. As has always been the case, and still is, this work is a compendium of everything pertaining to photography, and the photographer would be at a loss if he had not the volume near at hand for ready reference. Under the new guidance, the material brought together is all that could be desired, and in order that any particular portion of it can be looked up at once there is a full "contents" and an elaborate index.

Other features of this annual consist in a capital popular account of photographic copyright as it exists to-day, a most interesting and varied "epitome of progress," being a survey, logically classified, of the year's labour in both technical and scientific photography, and articles contributed by leading writers. The directory of photographic societies, formulæ for the principal photographic processes, and other facts have all been secured and brought up to date, rendering the volume indispensable to the busy photographer.

Nature in Eastern Norfolk. By Arthur H. Patterson. Pp. vii+352. (London: Methuen and Co., 1905.) Price 6*s.*

THIS book contains some very pleasant reading, for Mr. Patterson is a born naturalist, and writes with freshness and enthusiasm. Not the least interesting chapter is the autobiographical one, in which the author tells the story of his early passion for natural history, his painful struggles to gratify it, and his later misadventures, with much relish and humour. We gather that he has at last settled down to a homely life in his beloved native town, and hope that he may long continue in it. The second chapter, general observations on the fauna, is also very good reading, and here the human species is well represented by short but vigorous sketches of old punt-gunners and bird-catchers. The rest of the book is occupied with lists of birds, mammals, fishes, &c.; these naturally do not offer much that is new in a district that has been so thoroughly worked as east Norfolk, but they are often enlivened by anecdotes or personal reminiscences. The discovery of the black rat (*Mus rattus*) as a common species in Yarmouth is extremely interesting, and still more so is the occurrence of a few specimens of *M. alexandrinus*, its southern variety. Other contributions of Mr. Patterson to the natural history of the district are to be found in these pages; most of them are already known to members of the Norfolk and Norwich Naturalists' Society.

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